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Term: L4 and (virtual)

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DATE: Wednesday, September 14, 2005 Printable Copy Create Case

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DB=USPT; PLUR=YES; OP=ADJ			
L6	L4 and (virtual)	1	L6
L5	L4 and (virtual adj3 network$)	0	L5
L4	(5951650).pn.	1	L4
L3	L2 and ((assign$ or associat$) with (application$) with (different or separate$) with (IP adj1 address$))	6	L3
L2	709/$.ccls.	18881	L2
L1	5734865.pn.	1	L1

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L3: Entry 5 of 6 File: USPT Sep 14, 1999

DOCUMENT-IDENTIFIER: US 5951650 A
TITLE: Session traffic splitting using virtual internet protocol addresses associated with distinct categories of application programs irrespective of destination IP address

Abstract Text (1):
The present invention utilizes Virtual Internet Protocol Addressing (VIPA) to enable a host computer to efficiently route TCP/IP traffic across multiple physical links. This is accomplished by associating different applications or application sets with different virtual IP addresses. The virtual IP addresses may be associated with different physical adapters. Since many applications send similar data repeatedly, categorizing application sets and associating them with different physical adapters allows high volume applications to be associated with one adapter while lower volume, interactive data is associated with another adapter.

Brief Summary Text (12):
The present invention allows the administrator of a host that has multiple network interface adapters to associate each desired subset of applications with a virtual IP address (VIPA) and then configure the host to advertise a route to each such VIPA over a different real physical network interface adapter. This causes traffic for each subset of applications to be transmitted over a different real physical network interface adapter, which the network administrator can select to have bandwidth and delay characteristics that match the application. Therefore, if interactive applications such as TELNET are associated with one VIPA address, and high-bandwidth applications such as FTP are associated with another VIPA, then the voluminous FTP traffic can be segregated to one real physical network interface adapter so that it will not interfere with the interactive response time of the TELNET traffic that is segregated onto a different real physical network interface adapter. Furthermore, this host can be configured such that when a real physical network interface adapter fails, another one can serve as a backup by integrating the different subsets of traffic for the duration of the link failure.

Current US Original Classification (1):
709/238

Current US Cross Reference Classification (1):
709/240

CLAIMS:

1. A communications network comprising:

a host computer executing communications applications;

two or more communications interface adapters associated with said host computer;

one communications link attached to each of said two or more communications interface adapters connecting said host computer to a TCP/IP network;

a Virtual Internet Protocol Address (VIPA) associated with each of said communications interface adapters;

an output queue associated with each of said communications links and a corresponding one of the VIPAs; and,

two or more categories of communications applications executing on said host computer such that each VIPA is associated with one or more of said categories of communications applications wherein applications in a category communicate with said TCP/IP network over said communications interface adapter associated with said category of applications utilizing the associated one of the output queues by directing information to said associated VIPA such that communications of different categories utilize different ones of the output queues and corresponding communications links irrespective of a destination Internet Protocol (IP) address of a destination device.

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Database: US Pre-Grant Publication Full-Text Database; US Patents Full-Text Database; US OCR Full-Text Database; EPO Abstracts Database; JPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

Term: L4 and (virtual)

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L6	L4 and (virtual)	1	L6
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L4	(5951650).pn.	1	L4
L3	L2 and ((assign$ or associat$) with (application$) with (different or separate$) with (IP adj1 address$))	6	L3
L2	709/$.ccls.	18881	L2
L1	5734865.pn.	1	L1

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☐ 1. Document ID: US 5951650 A

L6: Entry 1 of 1 File: USPT Sep 14, 1999

DOCUMENT-IDENTIFIER: US 5951650 A
TITLE: Session traffic splitting using virtual internet protocol addresses associated with distinct categories of application programs irrespective of destination IP address

Abstract Text (1):
The present invention utilizes Virtual Internet Protocol Addressing (VIPA) to enable a host computer to efficiently route TCP/IP traffic across multiple physical links. This is accomplished by associating different applications or application sets with different virtual IP addresses. The virtual IP addresses may be associated with different physical adapters. Since many applications send similar data repeatedly, categorizing application sets and associating them with different physical adapters allows high volume applications to be associated with one adapter while lower volume, interactive data is associated with another adapter.

Brief Summary Text (8):
Related applications describing the Virtual IP Addressing (VIPA) technology are:

Brief Summary Text (9):
Application Ser. No. 08/755,420 entitled "Virtual Internet Protocol (IP) Addressing" filed on Nov. 22, 1996 and assigned to IBM Corp., now pending; and,

Brief Summary Text (10):
Application Ser. No. 08/761,469 entitled "Host Identity TakeOver Using Virtual Internet Protocol (IP) Addressing" filed on Dec. 6, 1996 also assigned to IBM Corp, now pending.

Brief Summary Text (12):
The present invention allows the administrator of a host that has multiple network interface adapters to associate each desired subset of applications with a virtual IP address (VIPA) and then configure the host to advertise a route to each such VIPA over a different real physical network interface adapter. This causes traffic for each subset of applications to be transmitted over a different real physical network interface adapter, which the network administrator can select to have bandwidth and delay characteristics that match the application. Therefore, if interactive applications such as TELNET are associated with one VIPA address, and high-bandwidth applications such as FTP are associated with another VIPA, then the voluminous FTP traffic can be segregated to one real physical network interface adapter so that it will not interfere with the interactive response time of the TELNET traffic that is segregated onto a different real physical network interface adapter. Furthermore, this host can be configured such that when a real physical network interface adapter fails, another one can serve as a backup by integrating the different subsets of traffic for the duration of the link failure.

Brief Summary Text (13):
Without significantly increasing the cost of the network, this invention enhances the performance of a TCP/IP network using hosts with multiple or redundant devices or network interface adapters by eliminating the time that one class of application traffic must wait on another class of application traffic for transmission across network interface adapters, while also providing for backup during the failure of one or more real physical network interface adapters. This is accomplished by the use of a virtual device, a virtual adapter, a virtual IP address (VIPA), and Routing Information Protocol (RIP) route forwarding output filters.

Detailed Description Text (2):
The preferred embodiment of the present invention is implemented in, but not limited to, an IBM MVS (501) host running the TCP/IP protocol and directly connected to a network (503) by two or more links (505) connected to the host through two or more adapters (507). This configuration allows for multiple virtual IP addresses, each of which selects a subset of TCP/IP applications executing on one TCP/IP stack in one host, to proceed without selecting a specific real physical network interface adapter or device. Other hosts that connect to one of the subsets of MVS TCP/IP applications executing on that host can send data to the MVS virtual IP address (VIPA) associated with that subset of applications via whatever paths are selected by the routing protocols. This is enabled by the use of RIP route forwarding filters. Transmission of traffic of one subset of applications between the host and the network will not interfere with transmission of traffic of another subset of applications. Furthermore, should the real physical network interface adapter that is transmitting traffic for a certain subset of applications fail, one of the other real physical network interface adapters can transmit the traffic in a backup mode, although during the outage traffic from different subsets of applications may be mixed. This is explained more completely by way of example in FIGS. 1 and 3.

Detailed Description Text (4):
FIG. 1 is a representative example of a network that does not use session traffic splitting while still implementing Virtual IP Addressing (VIPA). Host MVS.sub.-- M (101) has VIPA address VIPA.sub.-- M (106) by which all clients address host MVS.sub.-- M. Host MVS.sub.-- M is executing two applications, TELNET (102) and File Transfer Protocol (FTP) (103), both of which are running on the same TCP/IP stack (104). The TCP/IP stack uses the Network Interface Layer (105) to transmit datagrams to and from the IP Network (111). Within the Network Interface Layer the output queue OutQueue1 (107) holds datagrams ready for transmission across Link.sub.-- 1 (109), and the output queue OutQueue2 (108) holds datagrams ready for transmission across Link.sub.-- 2 (110). Both Link.sub.-- 1 and Link.sub.-- 2 connect to the IP Network. In this ex ample Client.sub.-- X (112) has connections to both TELNET and FTP via Link.sub.-- 1, and Client.sub.-- Y (113) has connections to both TELNET and FTP via Link.sub.-- 2. In both OutQueue1 and OutQueue2 Telnet datagrams may be waiting for transmission behind several FTP datagrams.

CLAIMS:

1. A communications network comprising:

a host computer executing communications applications;

two or more communications interface adapters associated with said host computer;

one communications link attached to each of said two or more communications interface adapters connecting said host computer to a TCP/IP network;

a Virtual Internet Protocol Address (VIPA) associated with each of said communications interface adapters;

an output queue associated with each of said communications links and a corresponding one of the VIPAs; and,

two or more categories of communications applications executing on said host computer such that each VIPA is associated with one or more of said categories of communications applications wherein applications in a category communicate with said TCP/IP network over said communications interface adapter associated with said category of applications utilizing the associated one of the output queues by directing information to said associated VIPA such that communications of different categories utilize different ones of the output queues and corresponding communications links irrespective of a destination Internet Protocol (IP) address of a destination device.

4. A method of connecting a host computer to a TCP/IP network, said host computer having two or more communications interface adapters, each communications interface adapter attached to one communication link and executing two or more applications, said method comprising the steps of:

defining a virtual Internet protocol (IP) address associated with each of said communications interface adapters;

programmatically categorizing each of said applications programs into distinct categories;

programmatically associating each of said distinct categories of applications programs with a virtual IP address; and,

sending information from any of said applications programs over said TCP/IP network by indicating said associated virtual IP address and utilizing said associated communications interface adapter irrespective of a destination address associated with the information.

7. A programmable media for transferring information to a host computer, said programmable media containing a programmably implemented method of connecting a host computer to a TCP/IP network, said host computer having two or more communications interface adapters,

each communications interface adapter attached to one communications link and executing two or more applications, said method comprising the steps of:

defining a virtual internet protocol (IP) address associated with each of said communications interface adapters;

programmatically categorizing each of said applications programs into distinct categories;

programmatically associating each of said distinct categories of applications programs with a virtual IP address; and,

sending information from any of said applications programs over said TCP/IP network by indicating said associated virtual IP address and utilizing said associated communications interface adapter irrespective of a destination address associated with the information.

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Term	Documents
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(L4 AND (VIRTUAL)).USPT.	1

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